Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for calibrating parameters of sensor elements in a sensor array, comprising the steps of:

receiving ~~an~~ output ~~signal~~ signals of at least two sensor elements ~~signal~~ in reaction to an input signal from a signal source;

estimating a cross-correlation between the output signals of at least two of said sensor elements;

optimising a difference between the estimated cross-correlation and a cross-correlation model; and

~~thereby~~ estimating said parameters from the optimised difference;

wherein ~~a~~ the cross-correlation model is ~~used as~~ represented by the following mathematical equation:

$$\boldsymbol{R} = \boldsymbol{G}\ \boldsymbol{B}\ \boldsymbol{G}^{H} + \boldsymbol{D}$$

in which ~~equation~~:

$\boldsymbol{R}$ represents a cross-correlation matrix,

$\boldsymbol{G}$ represent a gain matrix comprising gain parameters,

$\boldsymbol{G}^{H}$ represents ~~the~~ an Hermitian conjugate of the gain matrix,

$\boldsymbol{D}$ represents a ((block) diagonal) noise matrix comprising noise parameters and

$\boldsymbol{B}$ represents a matrix comprising information about the signal source.

Claim 2 (original): A method as claimed in claim 1, wherein said difference is a least square difference.

Claim 3 (previously presented): A method as claimed in claim 1, wherein the cross-correlation is obtained by determining a time-averaged covariance matrix from the output signals.

Claim 4 (previously presented): A method as claimed in claim 1, wherein the sensor array is a single polarization or non-polarized sensor array.

Claim 5 (previously presented): A method as claimed in claim 1, wherein the sensor elements are dual polarization sensor elements for receiving a dual polarised signal.

Claim 6 (previously presented): A method as claimed in claim 1, wherein said method is performed for output signals of the sensor elements generated in reaction to input signals from at least three signal sources with different polarizations.

Claim 7 (original): A method as claimed in claim 4, wherein said optimising comprises:
minimising a difference between a weighted logarithm of the estimated cross-correlation and a weighted logarithm of the cross-correlation and
estimating the gain of at least one of the sensor elements from said difference.

Claim 8 (original): A method as claimed in claim 7, wherein the logarithm is weighted by a weighting matrix with matrix values relating to said gain parameters.

Claim 9 (previously presented): A method as claimed in claim 7, wherein said optimising and said estimating gain parameters are performed at least a first time and a second time, wherein in the first time an uniform weight is used for all output signals and in the second time the weight is used in dependence on the gain estimated in the first time for the respective output signals.

Claim 10 (previously presented): A method as claimed in claim 7, wherein said optimising comprises an operation as represented by the mathematical equation:

$$\{\mathbf{g}_{est}\} = \mathrm{argmin}_{\mathbf{g},\mathbf{k}} \left(\left\| \mathbf{W}\ \mathbf{J}\ \mathrm{vec}\left(\ln(\mathbf{R}_{est}) - \ln(\mathbf{g}\ \mathbf{g}^{H}) + 2\pi\mathbf{k}i\right) \right\|_F\right)^2,$$

in which equation:

$\mathbf{g}_{est}$ represents the parameter to be estimated;

$\mathbf{g}$ represents a variable;

$\mathbf{g}^{H}$ represents the Hermitian conjugate of the variable;

$\mathbf{J}$ represent a selection matrix which puts zeros on the main diagonal;

$\mathbf{k}$ represents a phase unwrapping vector containing integer values;

$\mathbf{W}$ represents a weighting matrix; and

$\mathbf{R}_{est}$ represents the estimated cross-correlation.

Claim 11 (previously presented): A method as claimed in claim 1, wherein the signal source is a satellite in orbit around a celestial body.

Claim 12 (previously presented): A method as claimed in claim 1, wherein the signal source is a pulsar.

Claim 13 (previously presented): A method as claimed in claim 1, wherein the output signals have a low signal to noise ratio.

Claim 14 (previously presented): A method as claimed in claim 1, wherein the sensor elements are antennas in a phased array antenna.

Claim 15 (previously presented): A method as claimed in claim 1, wherein the sensor elements are electro-magnetic sensors elements.

Claim 16 (previously presented): A method as claimed in claim 1, wherein the sensor elements are acoustical sensor elements.

Claim 17 (currently amended): A calibration system for calibrating parameters of sensor elements in a sensor array, the system comprising:

at least two inputs, each connectable to an output of ~~an~~ a sensor element in a sensor array;

a correlation estimator device for estimating a correlation between ~~the~~ output signals of at least two of said sensor elements;

an optimiser device for optimising a difference between the estimated cross-correlation and a cross-correlation model and ~~thereby~~ estimating said parameters from the optimised difference; and

a memory device containing the cross-correlation model, ~~which~~ the model ~~is~~ being represented by the following mathematical equation:

$$R = G\ B\ G^{H} + D$$

in which ~~equation~~:

R represents a cross-correlation matrix,

G represent a gain matrix comprising gain parameters,

G^{H} represents ~~the~~ an Hermitian conjugate of the gain matrix,

D represents a noise matrix comprising noise parameters and

B represents a matrix comprising information about the signal source ~~and~~.

Claim 18 (previously presented): A calibration system as claimed in claim 17, wherein the sensor array is a dual polarised sensor array.

Claim 19 (original): A calibration system as claimed in claim 17, wherein the sensor array is a single polarization or non-polarized sensor array.

Claim 20-22 (cancelled).

Claim 23 (new): An array signal processing system having sensor elements and a calibration system for calibrating the sensor elements, the calibration system comprising:

a device for receiving output signals of at least two sensor elements in reaction to an input signal from a signal source;

a correlation estimator device for estimating a cross-correlation between the output signals of at least two of said sensor elements;

an optimiser device for optimising a difference between the estimated cross-correlation and a cross-correlation model; and

an estimator device for estimating said parameters from the optimised difference;

wherein the cross-correlation model is represented by the following mathematical equation:

$$\boldsymbol{R} = \boldsymbol{G}\ \boldsymbol{B}\ \boldsymbol{G}^{H} + \boldsymbol{D}$$

in which:

$\boldsymbol{R}$ represents a cross-correlation matrix,

$\boldsymbol{G}$ represent a gain matrix comprising gain parameters,

$\boldsymbol{G}^{H}$ represents an Hermitian conjugate of the gain matrix,

$\boldsymbol{D}$ represents a ((block) diagonal) noise matrix comprising noise parameters, and

$\boldsymbol{B}$ represents a matrix comprising information about the signal source.

Claim 24 (new): A computer program having computer executable instructions and stored in a computer readable medium and which, when the instructions are executed by a programmable computer, perform the steps of:

receiving output signals of at least two sensor elements in reaction to an input signal from a signal source;

estimating a cross-correlation between the output signals of at least two of said sensor elements;

optimising a difference between the estimated cross-correlation and a cross-correlation model; and

estimating said parameters from the optimised difference;

wherein the cross-correlation model is used as represented by the following mathematical equation:

$$\boldsymbol{R} = \boldsymbol{G}\,\boldsymbol{B}\,\boldsymbol{G}^{H} + \boldsymbol{D}$$

in which:

$\boldsymbol{R}$ represents a cross-correlation matrix,

$\boldsymbol{G}$ represent a gain matrix comprising gain parameters,

$\boldsymbol{G}^{H}$ represents an Hermitian conjugate of the gain matrix,

$\boldsymbol{D}$ represents a ((block) diagonal) noise matrix comprising noise parameters and

$\boldsymbol{B}$ represents a matrix comprising information about the signal source.

Claim 25 (new): A computer readable medium having computer executable instructions stored therein, said instructions, when being executed by a computer, perform the steps of:

receiving output signals of at least two sensor elements in reaction to an input signal from a signal source;

estimating a cross-correlation between the output signals of at least two of said sensor elements;

optimising a difference between the estimated cross-correlation and a cross-correlation model; and

estimating said parameters from the optimised difference;

wherein the cross-correlation model is used as represented by the following mathematical equation:

$$\boldsymbol{R} = \boldsymbol{G}\,\boldsymbol{B}\,\boldsymbol{G}^{H} + \boldsymbol{D}$$

in which:

$\boldsymbol{R}$ represents a cross-correlation matrix,

$\boldsymbol{G}$ represent a gain matrix comprising gain parameters,

$\boldsymbol{G}^{H}$ represents an Hermitian conjugate of the gain matrix,

$\boldsymbol{D}$ represents a ((block) diagonal) noise matrix comprising noise parameters and

$\boldsymbol{B}$ represents a matrix comprising information about the signal source.